

AMENDMENT THE CLAIMS:

Claims 1 – 89 (cancelled in the preliminary amendment)

90. (currently amended) A method of repeatedly measuring a known volume of a fluid in a miniature fluidic system, comprising:

providing a microfabricated device having at least first and second chambers connected by at least one common channel disposed therein, wherein said at least first and second chambers are in fluid connection with ~~each comprise~~ at least one vent port and at least one pressure inlet, and wherein at least one of said chambers is a volumetric chamber having a known volume;

providing a diaphragm valve constructed in communication with said at least one chamber and constructed to create a pressure differential in said device for displacing fluid;

filling said volumetric chamber with said fluid to create a first aliquot of said fluid by actuating said diaphragm valve using an external source to generate said pressure differential in said device;

71 transporting said first aliquot of said fluid to said at least second chamber by actuating said diaphragm; and

repeating said filling and transporting steps by applying said pressure differential from said diaphragm valve using said an external source and by employing said at least one vent port.

91. (Original) The method of claim 90, wherein each of said chambers of said device provided in said providing step has a cross sectional dimension of from about 0.05 to about 20 mm, and a depth dimension of from about 0.05 to about 5 mm.

92. (currently amended) A method of measuring and processing a known volume of a fluid in a miniature fluidic system for integrated nucleic acid analysis, comprising the acts of:

providing a microfabricated device having at least first and second chambers each including a fluid port connected by a common channel disposed therein, said at

least first and second chambers being in communication with including at least one vent port₁ and at least one of said chambers being a volumetric chamber having a known volume;

providing a sealable closure inlet to said microfabricated device constructed and arranged to introduce fluid to be delivered to said chambers;

providing at least one valve controllable controlled by an external pressure source constructed for displacing fluid inside said device;

filling said volumetric chamber with said fluid to create a first aliquot of said fluid by opening said controllable valve and by using said vent port;

creating a pressure differential in said device acting on said fluid in said volumetric chamber; and

transporting said first aliquot of said fluid to said at least second chamber by applying said pressure differential from said external source.

93. (previously added) The method of claim 92 including applying a positive pressure with respect to said volumetric chamber, whereby said positive pressure forces said fluid from said volumetric chamber during said opening of said controllable valve.

94. (currently amended) The method of claim 92 or 93 including venting said volumetric chamber using said vent port.

95. (currently amended) The method of claim 92 or 93 including venting said volumetric chamber using a hydrophobic membrane sealably disposed across said vent port.

96. (currently amended) The method of claim 93 wherein said applying said positive pressure includes using a pneumatic system cooperatively arranged with said external source.

97. (previously added) The method of claim 97 wherein said using said pneumatic system includes using a differential pressure delivery system capable of applying a first pressure to said volumetric chamber and a second pressure to said second chamber.

98. (previously added) The method of claim 92 including applying a negative pressure with respect to said volumetric chamber, whereby said negative pressure forces said fluid into said volumetric chamber during said opening of said controllable valve.

99. (currently Amended) The method of claim 98 wherein said applying said negative pressure includes using a pneumatic system cooperatively arranged with said external source.

100. (previously added) The method of claim 99 wherein said using said pneumatic system includes using a differential pressure delivery system capable of applying a first pressure to said volumetric chamber and a second pressure to said second chamber.

101. (previously added) The method of claim 92 including measuring temperature of said fluid.

102. (previously added) The method of claim 92 including heating said fluid.

103. (previously added) The method of claim 92 including performing microcapillary electrophoresis.

104. (previously added) The method of claim 92 including performing transcription.

105. (previously added) The method of claim 92 including performing labeling.

106. (previously added) The method of claim 92 including performing fragmentation

107. (previously added) The method of claim 92 including performing amplification.

108. (previously added) The method of claim 107 wherein said performing amplification includes performing polymerase chain reaction (PCR).

109. (previously added) The method of claim 107 wherein said performing amplification includes performing ligase chain reaction (LCR).

110. (previously added) The method of claim 107 wherein said performing amplification includes performing self sustained sequence replication.

DI 111. (previously added) The method of claim 107 wherein said performing amplification includes performing nucleic acid based sequence amplification (NASBA).

112. (previously added) The method of claim 92 wherein said fluid includes a reagent.

113. (previously added) The method of claim 92 wherein said fluid includes a buffer.

114. (previously added) The method of claim 92 wherein said fluid includes a biological polymer.

115. (previously added) The method of claim 92 including reconstituting a reagent kept in a lyophilized form.

116. (previously added) The method of claim 115, wherein said reconstituting includes transporting said first aliquot of said fluid to said second chamber wherein said reagent is located.

117. (currently amended) A miniature fluidic system for measuring and processing a known volume of a fluid controlled by an external pressure source, comprising:

a microfabricated device having at least first and second chambers in communication with a common channel disposed therein, each said at least first and second chambers including at least one vent port and at least one of said chambers being a volumetric chamber having a known volume;

a sealable closure inlet to said microfabricated device constructed to enable introduction of a liquid to be delivered to said chambers;

at least one valve controlled by an external pressure source;

means for creating pressure differential in said device for filling said volumetric chamber with said fluid to create a first aliquot of said fluid;

means for opening said controllable valve and thereby applying said pressure differential to said first aliquot of said fluid; and

means for enabling transport of transporting said first aliquot of said fluid to said at least second chamber using said pressure differential.

118. (previously added) The system of claim 117 including means for measuring temperature of said fluid.

119. (previously added) The system of claim 117 including means for heating said fluid.

120. (previously added) The system of claim 117 including means for performing microcapillary electrophoresis.

121. (previously added) The system of claim 117 including means for performing transcription.

122. (previously added) The system of claim 117 including means for performing labeling.

123. (previously added) The system of claim 117 including means for performing fragmentation

124. (previously added) The system of claim 117 including means for performing amplification.

D1 125. (previously added) The system of claim 124 wherein said means for performing amplification includes means for performing polymerase chain reaction (PCR).

126. (previously added) The system of claim 124 wherein said means for performing amplification includes means for performing ligase chain reaction (LCR).

127. (previously amended) The system of claim 117 wherein said sealable closure inlet is constructed for introduction of a reagent.

128. (previously amended) The system of claim 117 wherein sealable closure inlet is constructed for introduction of a buffer.

129. (previously amended) The system of claim 117 wherein sealable closure inlet is constructed for introduction of a biological polymer.

130. (previously amended) The system of claim 117 including means for reconstituting a reagent kept in a lyophilized form.

131. (previously amended) The system of claim 130, wherein said means for reconstituting includes means for transporting said first aliquot of said fluid to said second chamber wherein said reagent is located.

132. (previously added) The method of claim 90 including applying a positive pressure with respect to said volumetric chamber, whereby said positive pressure forces said fluid from said volumetric chamber.

DI 133. (previously added) The method of claim 90 including applying a negative pressure with respect to said volumetric chamber, whereby said negative pressure forces said fluid into said volumetric chamber.

134. (previously added) The method of claim 92 includes introducing a liquid including a sample through said sealable closure inlet formed by a septum.

135. (previously added) The system of claim 117 wherein said sealable closure inlet includes a septum.
